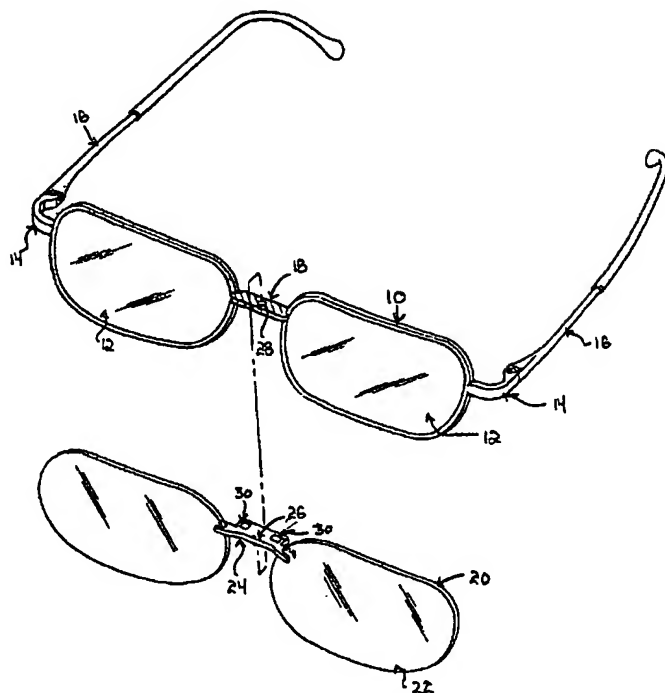




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(72) STORACE, PAUL, CA
(71) THOMPSON, DOUG, CA
(71) STORACE, PAUL, CA
(51) Int.Cl.⁷ G02C 9/00
(54) **LUNETTES**
(54) **EYEGLASSES**



(57) The present invention is directed to an eyeglasses device comprising a primary spectacle frame for supporting primary lenses therein. The primary spectacle frame includes a middle bridge portion and two side portions with each side portion having an end piece extending rearwardly therefrom to which temple pieces are connected. The middle bridge portion and/or the end piece are fabricated substantially entirely from a material attracted by a magnetic field. An auxiliary spectacle frame is provided for supporting auxiliary lenses therein. The auxiliary spectacle frame includes a middle bridge portion having at least one magnetic connecting member generating a magnetic field. The construction of the eyeglasses allows for the auxiliary spectacle frame to be readily attached to the primary spectacle frame with only one hand by a user.

Abstract

The present invention is directed to an eyeglasses device comprising a primary spectacle frame for supporting primary lenses therein. The primary spectacle frame includes a middle bridge portion and two side portions with each side portion having an end piece extending rearwardly therefrom to which temple pieces are connected. The middle bridge portion and/or the end piece are fabricated substantially entirely from a material attracted by a magnetic field. An auxiliary spectacle frame is provided for supporting auxiliary lenses therein. The auxiliary spectacle frame includes a middle bridge portion having at least one magnetic connecting member generating a magnetic field. The construction of the eyeglasses allows for the auxiliary spectacle frame to be readily attached to the primary spectacle frame with only one hand by a user.

15

Eyeglasses

Field of the Invention

This invention relates to eyeglasses. More specifically, the present invention
5 relates to an improved primary-auxiliary eyeglasses device.

Background of the Invention

Several different types of eyeglasses have been designed which are composed
of primary eyeglasses having an attachable auxiliary lens frame. Such an auxiliary
10 frame is often used to transform the primary eyeglasses into sunglasses or to be for
magnifying purposes. Typically, the auxiliary frames have been clipped onto the
primary eyeglass frame. However, this arrangement is cumbersome as it is difficult to
readily detach and reattach the auxiliary lens frame to the primary frame.
Furthermore, such a design is not very attractive.

15 More recently, several different attempts have been made to magnetically
attach the auxiliary lens frame to the primary eyeglasses frame. For example, U.S.
Patent 4,070,103 discloses a primary eyeglasses frame having a slidably attachable
auxiliary lens. The primary lens is made of magnetizable material and the auxiliary
lenses are securable to the primary lenses by a magnetic strip inserted in a groove on
20 the inside surface of the auxiliary lens.

U.S. Patent 5,416,537 discloses a primary frame having a first magnetic
member attached vertically to the front surface of the primary frame and a second
magnetic member attached in a corresponding position on the back surface on an
auxiliary frame. The magnetic members are arranged for engagement to secure the
25 auxiliary frame to the primary frame.

U.S. Patent 5,568,207 discloses a magnetically adhered auxiliary lens frame in
which the primary lens frame has horizontally disposed magnets attached to the rear
and side portions that mate with horizontally disposed magnets in the arms of the
auxiliary frame. The arms of the auxiliary frame engage with and are supported by
30 upper side portions of the primary frame. Similar constructions of eyeglasses are
disclosed in U.S. Patents 5,737,054, 5,883,688, 5,882,101 and 5,877,838 wherein the
magnetic members in the primary lens frame and the auxiliary frame are disposed at
varying locations such as at the top or bottom of the side portions of both of the
frames, or on the bridge portion of the primary and auxiliary frames. In each case, the

user must align small pairs of magnetic or magnetizable members in order to attach the auxiliary frame to the primary frame.

While these eyeglasses designs do provide for the reversible attachment of auxiliary lenses to a primary lens, they all suffer from the disadvantage that there is potential disengagement of the auxiliary lenses when other than relative downward movement occurs. Also, small pairs of magnetic members or magnetizable materials are required in both the frame of the primary and auxiliary lenses for engagement such that the strength of the frame is decreased. Furthermore, the design of the paired magnetic members necessitates modifications to the design of the primary and auxiliary eyeglass frame which creates a bulkier frame than regular eyeglasses and is not very attractive or desirable.

There was therefore a need to develop and design eyeglasses which are esthetically pleasing, comfortable to wear and which more stably secure the auxiliary frames to the primary frame and can be more easily attached with only one hand by a user.

Summary of the Invention

An object of the present invention is to provide an eyeglasses device which is very reliable and safe for the user.

According to another object of the present invention is to provide an eyeglasses device which comprises a primary spectacle frame onto which an auxiliary spectacle frame can be reversibly secured through the use of magnetic elements in the auxiliary frame.

According to a further object of the present invention is the provision of an eyeglasses device in which the primary spectacle frame has a component member that is constructed of a magnetic field attractable material.

In accordance with the present invention there is provided an eyeglasses device comprising:

- a primary spectacle frame for supporting primary lenses therein, said primary spectacle frame including a middle bridge portion and two side portions, each side portion having an end piece extending rearwardly therefrom to which temple pieces are connected, wherein the middle bridge portion and/or the end piece are fabricated substantially entirely from a material attracted by a magnetic field ; and

- an auxiliary spectacle frame for supporting auxiliary lenses therein, said auxiliary spectacle frame including a middle bridge portion having at least one magnetic connecting member generating a magnetic field,
- wherein said auxiliary spectacle frame can be attached to said primary
5 spectacle frame with only one hand by a user.

In one embodiment of the invention the magnetic connecting member is located within the middle bridge portion of the auxiliary spectacle frame. Such magnetic member will be readily attracted to the magnet attractable middle bridge portion of the primary spectacle frame.

- 10 In another embodiment, the auxiliary spectacle frame has side arms which are fabricated from a magnetic material that is readily attracted to metallic or like material extension members of the primary spectacle frame such that the auxiliary spectacle frame can be secured to the primary spectacle frame. The side arms can be of varying construction such as completely fabricated from a magnetic material or have magnetic
15 material incorporated therein as an insert located in various positions of the side arms for corresponding engagement with the end pieces of the primary spectacle frame.

- In yet a further embodiment of the invention, the primary spectacle frame can be fabricated of a plastic or like material into which an elongate metallic or some other material which is attracted by a magnetic field or magnet strip is embedded.
20 The metallic or magnet strip is sufficiently large enough to extend the entire length of the middle bridge portion of the primary spectacle frame as well as extend the entire length of the end pieces. In other embodiments, the metallic or magnet strip can be fabricated to constitute the middle bridge portion or the end pieces. In this aspect, a plastic or like material primary spectacle frame will have a middle bridge portion
25 and/or end pieces fabricated entirely of a metallic or magnetic field attractable material.

- In a further embodiment of the invention, the auxiliary spectacle frame additionally comprises a projection in the middle bridge portion for engaging with a corresponding aperture in the auxiliary spectacle frame. It is understood that two
30 projections can be incorporated in the middle bridge portion of the auxiliary spectacle frame in which case two apertures would be provided on the corresponding middle bridge portion of the primary spectacle frame.

The objects and advantages of the present invention will become apparent from the detailed description to follow taken together with the appended claims.

Brief Description of the Drawings

5 A detailed description of the preferred embodiments are provided herein below with reference to the following drawings in which:

Figure 1 is a front perspective view of a first embodiment of the eyeglasses of the present invention showing the primary and auxiliary spectacle frames not combined;

10 Figure 2A is an enlarged and partially cut away view of the eyeglasses of Figure 1 showing the primary spectacle frame and auxiliary spectacle frame in combination;

Figure 2B is a cross sectional view taken along the middle bridge portion of Figure 2A;

15 Figure 3A is an enlarged and partially cut away view of a further embodiment of the eyeglasses of Figure 1;

Figure 3B is a cross sectional view taken along the middle bridge portion of Figure 3A;

20 Figure 4A is a front perspective view of a further embodiment of the eyeglasses of Figure 1 showing the primary and auxiliary spectacle frames not combined;

Figure 4B is an enlarged and partially cut away view of the eyeglasses of Figure 4A;

25 Figure 4C is an enlarged and partially cut away view of a further embodiment of the eyeglasses of Figure 4A;

Figure 4D is an enlarged and partially cut away view of a further embodiment of the eyeglasses of Figure 4A showing a different engagement between the primary spectacle frame and the auxiliary spectacle frame;

30 Figure 4E is an enlarged and partially cut away view of the eyeglasses of Figure 4D showing a portion of the primary and the auxiliary lenses and a different embodiment of the end piece of the primary spectacle frame;

Figure 4F is a is an enlarged and partially cut away view of a further embodiment of the primary spectacle frame end piece of the eyeglasses of Figure 4D;

Figure 5A is an enlarged and partially cut away view of a further embodiment of the eyeglasses of Figure 1 showing the middle bridge portions of the primary and the auxiliary spectacle frames;

Figure 5B cross sectional view of the middle bridge portion of Figure 5A when the primary and auxiliary spectacle frames are combined;

Figure 5C is a cross sectional view of the middle bridge portion of Figure 5A when the primary and auxiliary spectacle frames are combined showing a further embodiment; and

Figure 6 is a front perspective view of a further embodiment of the eyeglasses of Figure 1 showing only the primary spectacle frame.

In the drawings, preferred embodiments of the invention are illustrated by way of example. It is to be expressly understood that the description and drawings are only for the purpose of illustration and as an aid to understanding, and are not intended as a definition of the limits of the invention.

Detailed Description of the Preferred Embodiments

The invention will now be described with reference to the drawings in which like components are identified by like reference numerals in the various illustrated embodiments.

Referring to the drawings, and initially to Figures 1 to 3B, an eyeglasses device in accordance with the present invention comprises a primary spectacle frame 10 for supporting primary lenses 12 therein. The primary spectacle frame 10 includes two side portions each having an end piece 14 extending rearwardly therefrom for pivotally coupling temple pieces 16 thereto. The end piece 14 may be a separate piece attached by any suitable attachment means such as by welding or may be made integral with the primary spectacle frame 10.

The primary spectacle frame 10 includes a middle bridge portion 18 which is constructed of a material that is attracted by a magnetic field. Such materials are often referred to as ferromagnetic materials. Suitable materials for use include for example, but are not limited to stainless steel, iron, nickel and alloys thereof as well as ceramics that contain various metal oxides. Such materials will also encompass any new developed materials that attract a magnetic field. It is understood by those skilled in the art that not only the entire middle bridge portion 18 of the eyeglass

device may be constructed in such material but also the entire primary spectacle frame. In this embodiment, the entire primary spectacle frame appears as a regular eyeglasses frame without any special modifications.

An auxiliary spectacle frame 20 is provided for supporting the auxiliary lenses 5 22 therein and includes a middle bridge portion 24 having a projection 26 extending downward therefrom for engaging with a corresponding aperture 28 located in the middle bridge portion 18 of the primary spectacle frame 10.

The auxiliary spectacle frame also includes magnetic or magnetizable connector members 30 secured within the middle bridge portion 24 located on either 10 side of the projection 26. The magnetic connector members 30 engage with the middle bridge portion 18 of the primary spectacle frame 10. The magnetizable connector members may be fabricated of any suitable material that generates a magnetic field.

As better shown in Figure 2A, the engagement of the auxiliary spectacle frame 15 20 with the primary spectacle frame 10 via the projection 26 and corresponding aperture 28 minimizes any downward movement of the auxiliary spectacle frame 20 relative to the primary spectacle frame 10 and will not easily disengage from the primary spectacle frame 10 when the user conducts any high impact activity. Furthermore, the magnetic connector members 30 secure to any portion of the middle 20 bridge portion 18 of the primary spectacle frames 10 thus providing for additional stability. This obviates the user from having to align small paired magnetic or magnetizable members and thus makes the eyeglasses device more convenient to use and wear. This also obviates the need to design and secure small magnets or magnetizable members that must be embedded or otherwise affixed to the primary 25 and auxiliary spectacle frames thus decreasing the strength of the spectacle frames themselves.

As seen in Figures 2B and 3B, the design of the primary spectacle frame 10 and the auxiliary spectacle frame 20 allows for secure and esthetically pleasing engagement between the middle bridge portion 18 of the primary spectacle frame and 30 the middle bridge portion 24 of the auxiliary spectacle frame. Such engagement does not require any alignment of magnetic connector members between the primary spectacle frame 10 and the auxiliary spectacle frame 20 since magnetic connector members are only provided in the auxiliary spectacle frame 20. Therefore, such design makes it very easy for a user to engage the auxiliary spectacle frame 20 to the

primary spectacle frame 10. Also, the primary spectacle frame does not comprise several small components which need to be assembled and affect the integrity of the frame itself.

A further embodiment of the eyeglasses device is shown in Figure 3A. In this embodiment, the middle bridge portion 18 of the primary spectacle frame 10 has two apertures 28 to engage with two projections 26 located on the middle bridge portion 24 of the auxiliary spectacle frame 20. The magnetic connector members 30 are located on either side of the projections 26. Such construction provides for even greater stability between the primary spectacle frame 10 and the auxiliary spectacle frame 20, as seen in Figure 3B, when the two are combined and still provides an esthetically pleasing eyeglass device since the pins are not seen when the two frames are engaged and there are no bulky extensions on either of the primary or auxiliary frames.

As seen in both Figures 2B and 3B, the engagement of the auxiliary spectacle frame to the primary spectacle frame is juxtaposed along substantially the entire length of the middle bridge portions of the primary and auxiliary spectacle frames. While the middle bridge portions are shown to be substantially flat and juxtaposed together, it is understood that the middle bridge portions of both the primary and auxiliary spectacle frames can be curved or designed otherwise and still engage substantially juxtaposed with one another to provide a secure and esthetically pleasing engagement.

A further embodiment of the eyeglasses device of the present invention is seen in Figures 4A to 4C. In this embodiment, essentially the entire end piece 114 of the primary spectacle frame 110 is constructed of a material that is attracted by a magnetic field and not the middle bridge portion 118. Also, the auxiliary spectacle frame 120 has side arms 132 having a magnetic connector member 130 which engage with the end pieces 114 of the primary spectacle frame 110. The middle bridge portion 118 of the primary spectacle frame 110 contains an aperture 128 which engages with a corresponding projection 126 located on the middle bridge portion 124 of the auxiliary spectacle frame 120. It is understood by one skilled in the art that the middle bridge portion 118 of the primary spectacle frame may be fabricated to contain two apertures 128 as seen in the embodiment of Figure 3A. The middle bridge portion 124 of the auxiliary spectacle frame 120 would then be fabricated to have two projections 126 for engagement with the apertures 128.

Figure 4B better illustrates how the auxiliary spectacle frame 120 secures to the primary spectacle frame 110 via the engagement of the magnetic connector members 130 located within the side arms 132 of the auxiliary spectacle frame 120 to the end piece 114 of the primary spectacle frame 110. Such attachment requires no tedious alignment of small paired magnetic members. In Figure 4C it is shown that the magnetic connector member 130 of the auxiliary spectacle frame 120 can be incorporated on the outer side of the side arm 132 and will still readily engage with the end piece 114.

Figure 4D shows a further embodiment of the eyeglasses of Figure 4A. In this embodiment the entire side arms 132 of the auxiliary spectacle frame 120 can be fabricated of a magnetic material and in this manner engage with the end piece 114 of the primary spectacle frame 110 which is fabricated of a material that attracts a magnetic force.

In Figure 4E, it is illustrated that the side arms 132 of the auxiliary spectacle frame shown in Figure 4D are fabricated to contain a magnetic connector member 130. One skilled in art would readily comprehend that the side arms 132 can be fabricated to be entirely of a magnetic material and thus constitute a magnet itself. The end piece 114 of the primary auxiliary frame 110 contains an elongated insert 134 of a material that attracts a magnetic force. In Figure 4F, it is illustrated that the entire end piece 114 of the primary spectacle frame 110 may be fabricated from a magnet attractable material of a metallic or like material to which the side arms 132 of the auxiliary frame seen in Figure 4E can attach and combine with.

Figure 5A shows an alternative embodiment of the eyeglasses of Figure 1. In this embodiment, the middle bridge portion 218 of the primary spectacle frame 210 is made entirely of a material that attracts a magnetic field. The auxiliary frame 220 has a middle bridge portion 224 having a magnetic connector member 230 incorporated therein. In one type of engagement shown in Figure 5B, the middle bridge portion 224 of the auxiliary frame 220 engages sideways onto the middle bridge portion 218 of the primary spectacle frame 210. Embedded within the middle bridge portion 224 of the auxiliary spectacle frame 220 is a magnetic connector member 230. Alternatively as shown in Figure 5C, the middle bridge portion 224 of the auxiliary frame 220 may engage over top of the middle bridge portion 218 of the primary spectacle frame 210.

It is understood by one skilled in the art that the embodiment of the eyeglasses device of Figures 5A to 5C, the middle bridge portion 218 of the primary spectacle frame 210 may also have an aperture into which engages a corresponding projection located on the middle bridge portion 224 of the auxiliary spectacle frame 220. This construction would be similar to that shown in Figure 3A. Furthermore, it is understood that the eyeglasses device of Figures 4A to 4F can also be fabricated to have primary and auxiliary spectacle frames with a similar construction to that shown in Figure 3A with respect to the middle bridge portions of both primary and auxiliary spectacle frames having apertures and corresponding pins for combination.

A further embodiment of the present invention is shown in Figure 6. In this embodiment the primary spectacle frame 310 is constructed of a plastic or like material having a middle bridge portion 318 containing an elongate metallic or magnetic strip 336 embedded therein. The primary spectacle frame 310 also has end pieces 314, which can be integrally made or attached to the frame, also containing an elongate metallic or magnetic strip 336. An auxiliary frame is then provided having a middle bridge portion and side arms in which magnetic connector members are provided that would engage with the metallic or magnetic strips 336 embedded in the plastic spectacle frame 310. In this manner, the present invention is not simply limited to metallic or like material primary or auxiliary spectacle frames. In this embodiment of the invention, it is understood that the primary and auxiliary spectacle frame can be further made in accordance with any of the embodiments shown in Figures 1 to 5 in which pins and corresponding projections are provided as well as altering the attachment of the auxiliary spectacle frame to the primary spectacle frame with engagement of the end pieces with the side arms.

It is understood by those skilled in the art that the primary spectacle frame and auxiliary spectacle frame can be fabricated in various shapes and designs. Furthermore, the auxiliary lenses can be designed as sunglasses or as magnifying glasses.

It is also understood by those skilled in the art that while the magnet material is shown to be incorporated into the auxiliary spectacle frame and the magnet attractable material in the primary spectacle frame, this can be completely reversed. In this manner, the primary spectacle frame will have a bridge and/or end pieces or portions thereof fabricated of a magnet and the auxiliary spectacle frame will have a

bridge and/or side arms or portions thereof constructed of a material which attracts a magnetic force.

In all embodiments of the invention as shown in the Figures and further described herein, a user needs only to attach and secure the auxiliary spectacle frame to the primary spectacle frame using one hand. This is facilitated by providing an entire portion of the primary spectacle frame to be constructed of a magnet attractable material. Thus small pairs of magnetic members located on the primary and auxiliary frames do not have to be aligned by the user. Furthermore, the design and construction of the present eyeglasses provides great ease of use for the wearer as well as a more secure attachment of the auxiliary lenses to the primary spectacle lenses such that they will not easily be disengaged. The eyeglasses device of the present invention is easy to manufacture and also esthetically pleasing as there are no bulky attachment means or extensions present on the eyeglasses.

Although preferred embodiments have been described herein in detail, it is understood by those skilled in the art that variations may be made thereto without departing from the scope of the invention or the spirit of the appended claims.

I Claim:

1. An eyeglasses device comprising:
 - a primary spectacle frame for supporting primary lenses therein, said
 - 5 primary spectacle frame including a middle bridge portion and two side portions, each side portion having an end piece extending rearwardly therefrom to which temple pieces are connected, wherein the middle bridge portion and/or the end piece are fabricated substantially entirely from a material attracted by a magnetic field ; and
 - an auxiliary spectacle frame for supporting auxiliary lenses therein, said
 - 10 auxiliary spectacle frame including a middle bridge portion having at least one magnetic connecting member generating a magnetic field,
 - wherein said auxiliary spectacle frame can be attached to said primary spectacle frame with only one hand by a user.
- 15 2. The eyeglasses device as claimed in claim 1, wherein said auxiliary spectacle frame has a projection extended therefrom located in the middle bridge portion for engaging with a corresponding aperture in the middle bridge portion of the primary spectacle frame.
- 20 3. The eyeglasses device as claimed in claim 2, wherein said auxiliary spectacle frame has two projections extended therefrom in the middle bridge portion for engaging with two corresponding apertures in the middle bridge portion of the primary spectacle frame.
- 25 4. The eyeglasses device as claimed in claim 1, wherein the auxiliary spectacle frame additionally comprises side arms which include a magnetic connecting member generating a magnetic field for engaging with the end pieces of the primary spectacle frame.
- 30 5. The eyeglasses device as claimed in claim 4, wherein the auxiliary spectacle frame comprises side arms which are fabricated substantially entirely from a magnetic material for engaging with the end pieces of the primary spectacle frame.

6. The eyeglasses device as claimed in claim 1, wherein said material attracted by a magnetic field is selected from the group consisting of stainless steel, iron, nickel and alloys thereof as well as mixtures thereof.

5 7. The eyeglasses device as claimed in claim 1, wherein the engagement of the auxiliary spectacle frame to the primary spectacle frame is juxtaposed along substantially along the entire length of both of the middle bridge portions.

8. The eyeglasses device as claimed in claim 4, wherein the engagement of the
10 auxiliary spectacle frame to the primary spectacle frame is juxtaposed along substantially the entire length of the end pieces and the side arms of the primary and auxiliary spectacle frames.

9. An eyeglasses device comprising:

- 15 - a primary spectacle frame for supporting primary lenses therein, said primary spectacle frame including a middle bridge portion and two side portions, each side portion having an end piece extending rearwardly therefrom to which temple pieces are connected, wherein the middle bridge portion and/or the end piece are fabricated substantially entirely from a material attracted by a magnetic field ;
- 20 - an auxiliary spectacle frame for supporting auxiliary lenses therein, said auxiliary spectacle frame including a middle bridge portion having at least one magnetic connecting member generating a magnetic field,
- said auxiliary spectacle frame having at least one projection extended therefrom located in the middle bridge portion for engaging with a corresponding
- 25 aperture in the middle bridge portion of the primary spectacle frame;
- wherein said auxiliary spectacle frame can be attached to said primary spectacle frame with only one hand by a user.

10. An eyeglasses device comprising:

- 30 - a primary spectacle frame for supporting primary lenses therein, said primary spectacle frame including a middle bridge portion and two side portions, each side portion having an end piece extending rearwardly therefrom to which temple pieces are connected, wherein the entire length of the middle bridge portion and/or the end piece is embedded with a material attracted by a magnetic field ; and

- an auxiliary spectacle frame for supporting auxiliary lenses therein, said auxiliary spectacle frame including a middle bridge portion having at least one magnetic connecting member generating a magnetic field,
- wherein said auxiliary spectacle frame can be attached to said primary
5 spectacle frame with only one hand by a user.

11. The eyeglasses device as claimed in claim 10, wherein the auxiliary spectacle frame additionally comprises side arms which include a magnetic connecting member generating a magnetic field for engaging with the end pieces of the primary spectacle
10 frame.

12. The eyeglasses device as claimed in claim 11, wherein said auxiliary spectacle frame has a projection extended therefrom located in the middle bridge portion for engaging with a corresponding aperture in the middle bridge portion of the primary
15 spectacle frame.

13. An eyeglasses device comprising:
- a primary spectacle frame for supporting primary lenses therein, said primary spectacle frame including a middle bridge portion and two side portions, each
20 side portion having an end piece extending rearwardly therefrom to which temple pieces are connected, wherein the middle bridge portion and/or the end piece are fabricated to have at least one magnetic connecting member generating a magnetic field; and
 - an auxiliary spectacle frame for supporting auxiliary lenses therein, said
25 auxiliary spectacle frame including a middle bridge portion fabricated substantially entirely from a material that is attracted by a magnetic field,
 - wherein said auxiliary spectacle frame can be attached to said primary spectacle frame with only one hand by a user.

30 14. The eyeglasses device as claimed in claim 13, wherein said auxiliary spectacle frame has a projection extended therefrom located in the middle bridge portion for engaging with a corresponding aperture in the middle bridge portion of the primary spectacle frame.

15. The eyeglasses device as claimed in claim 14, wherein said auxiliary spectacle frame has side arms fabricated substantially entirely from a material that is attracted by a magnetic field.

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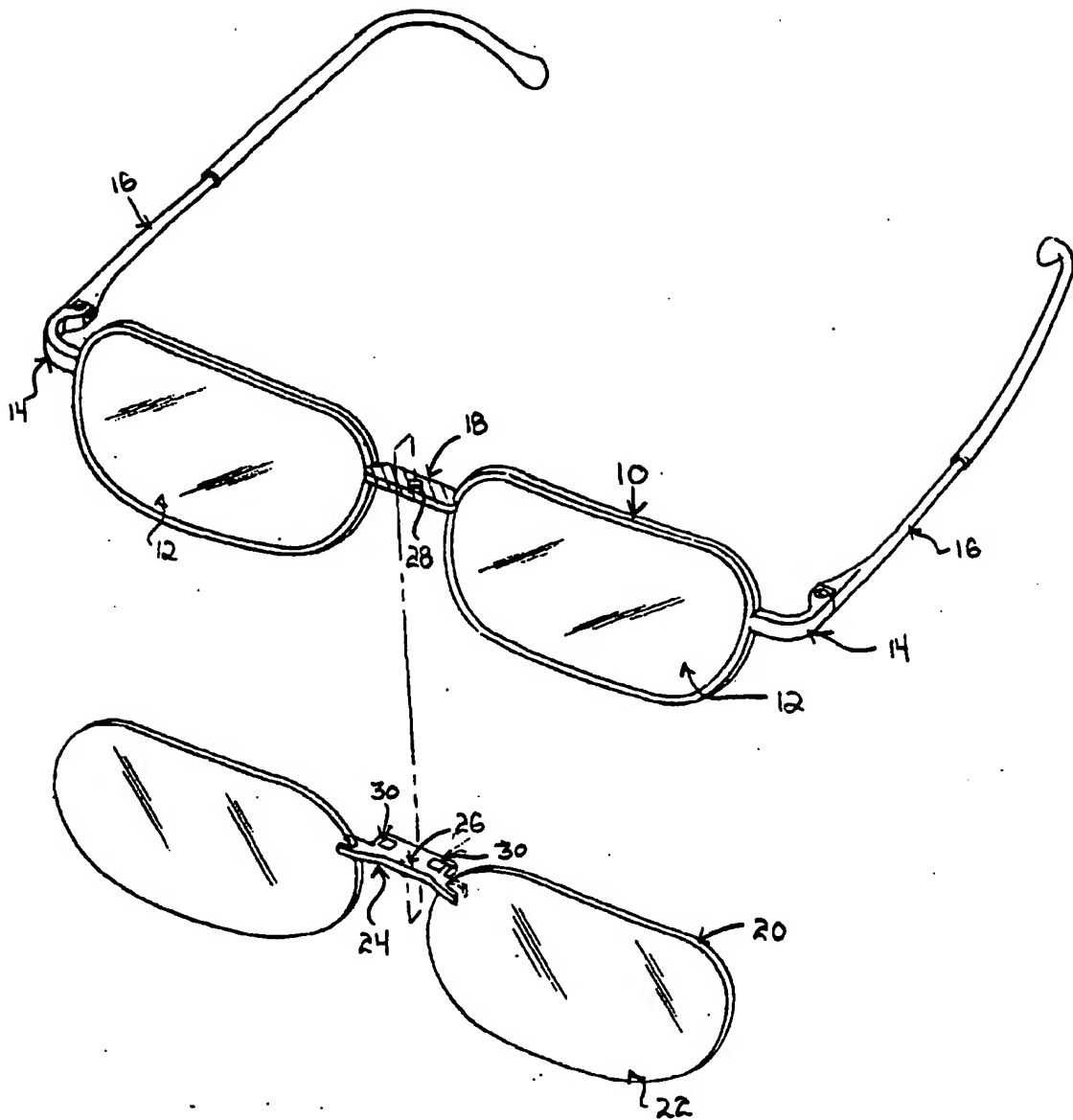
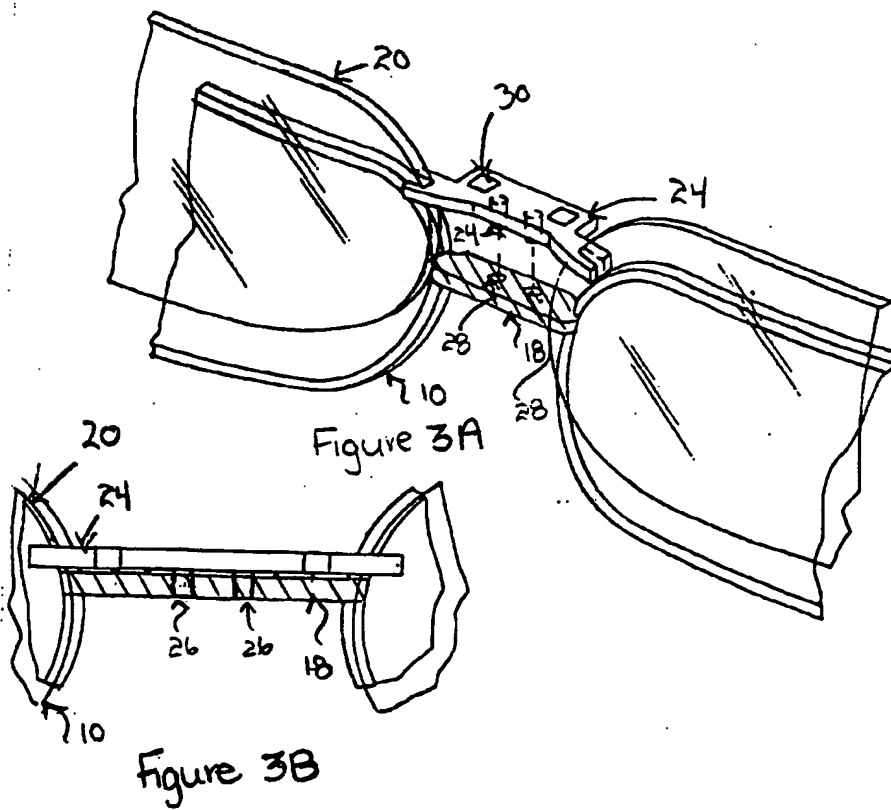
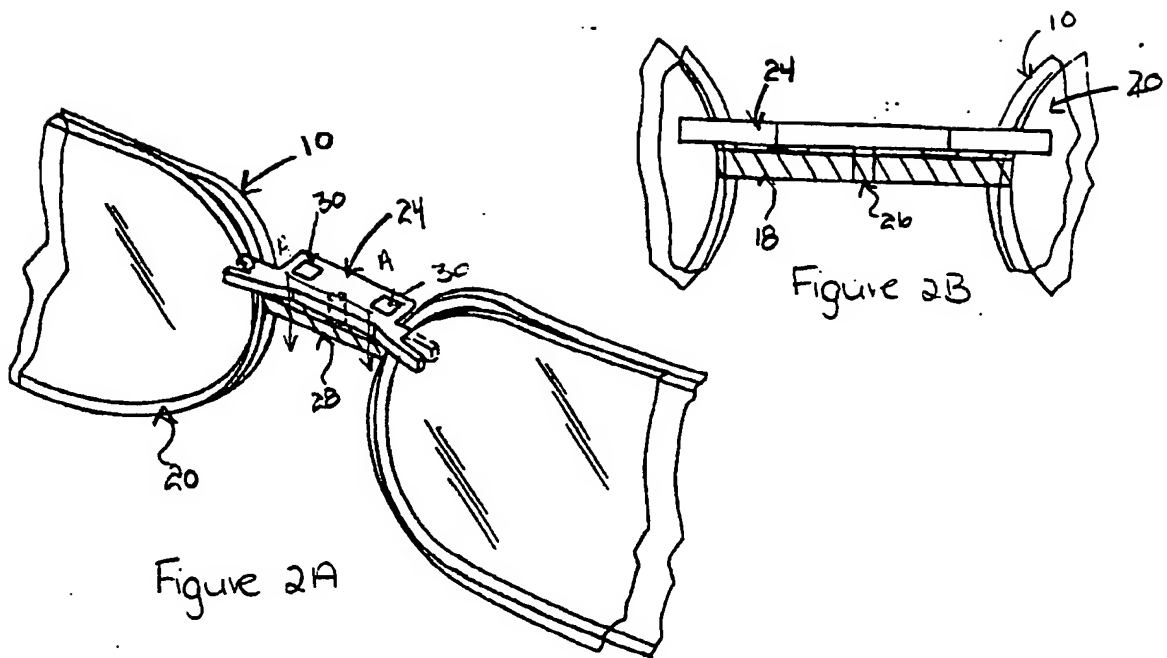


Figure 1

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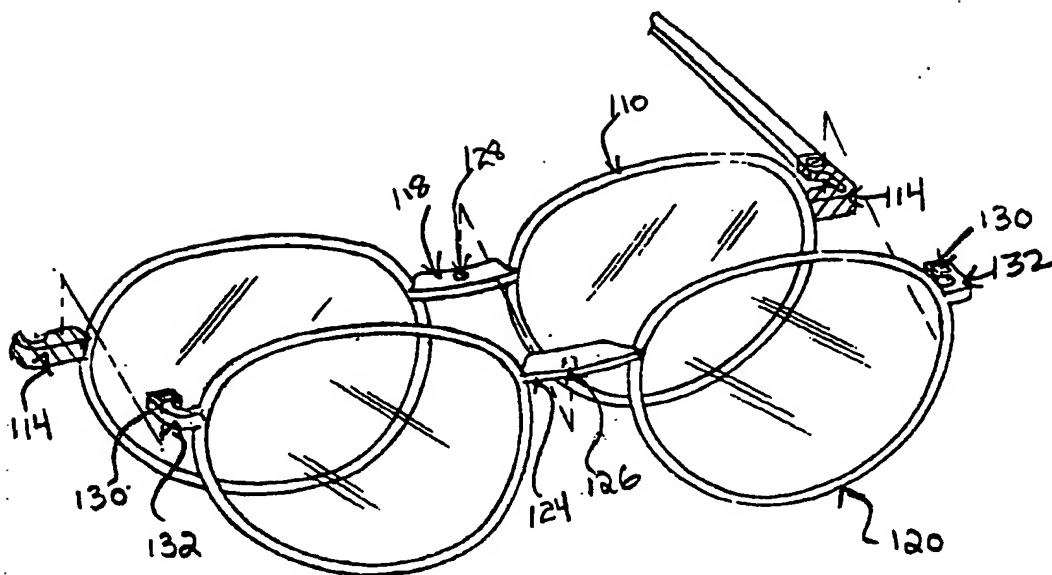


Figure 4A

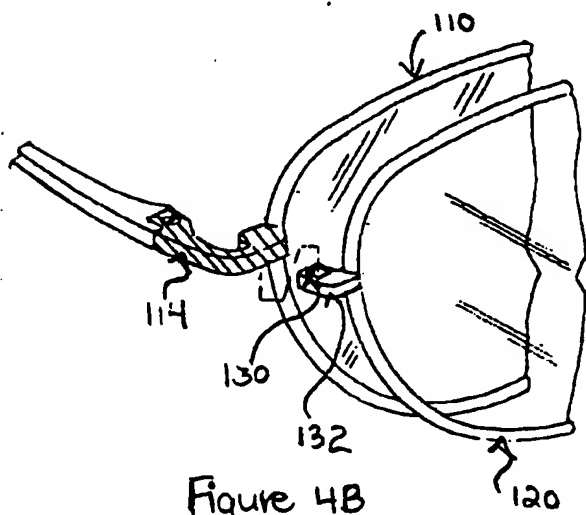


Figure 4B

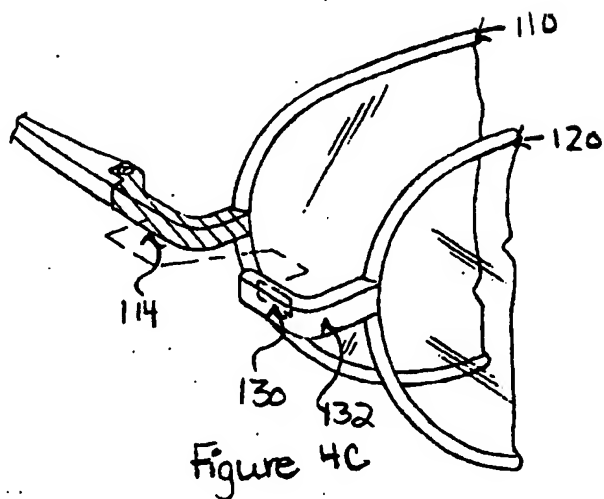


Figure 4C

